

WE CLAIM:

1. A method of forming carbon nanotubes in a flat panel display device comprising:

5 granulizing a catalyst layer to generate nano particles and to provide a voluminous surface area for growing a plurality of carbon nanotubes;

heating said catalyst layer upon which said plurality of carbon nanotubes is disposed to a temperature of about 300°C to 500°C;

10 soaking said catalyst layer in a soaking gas; and growing said plurality of carbon nanotubes by exposing said substrate to a plasma source gas at a density of $10^{10} - 10^{12} \text{ cm}^3$.

15 2. The method of claim 1 wherein the soaking gas is a hydro-carbon containing gas.

3. The method of Claim 2, wherein said soaking of said catalyst layer enhances granules of said catalyst layer diffuse into said plurality of carbon nanotubes as said plurality of carbon nanotubes are formed.

25 4. The method of Claim 3, wherein said catalyst layer is soaked in said soaking gas at a temperature range of 300°C to 500°C for approximately 1 - 30 minutes.

30 5. The method of Claim 4, wherein said catalyst layer is soaked in a vacuum environment. plurality of carbon nanotubes are formed on said granules of catalyst layer using a plasma chemical vapor desposition process at a high plasma pressure of 0.5Torr to 10Torr.

6. The method of Claim 5, wherein said plasma source gas comprises CH₄.

5 7. The method of Claim 2, wherein said hydro-carbon containing gas comprises C₂H₂.

8. The method of Claim 7, wherein said plasma source gas comprises a mixture of NH₃ and H₂.

10 9. The method of Claim 8, wherein said plasma source gas includes an additive gas to improve the quality of said plurality of carbon nanotubes formed on said catalyst layer.

15 10. The method of Claim 9, wherein said plasma source gas comprises a capacitively coupled plasma source.

20 11. The method of Claim 10, wherein said plasma source gas comprises an inductively coupled plasma source.

12. The method of Claim 11, wherein said plasma source gas comprises a microwave plasma source.

25 13. The method of Claim 8, wherein said additive gas comprises NH₃.

30 14. The method of Claim 13, wherein said additive gas comprises H₂.

15. The method of Claim 1, wherein said catalyst layer is disposed on a glass substrate.